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Our Docket No.: 042390.P6054

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Mark L. Skarpness, et al.

Application No.: 09/263,918

Filed: March 5, 1999

For: **METHOD FOR INTERFACING AN ATM NETWORK TO A PC BY IMPLEMENTING THE ATM SEGMENTATION AND REASSEMBLY FUNCTION IN PC SOFTWARE**

Examiner: Soon D. Hyun

Art Group: 2663

APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Appellants submit, in triplicate, the following Appeal Brief pursuant to 37 C.F.R. § 1.192 for consideration by the Board of Patent Appeals and Interferences. Appellants also submit herewith our check number 14509 in the amount of $320.00 to cover the cost of filing the opening brief as required by 37 C.F.R. § 1.17(c). Please charge any additional fees or credit any overpayment to our deposit Account No. 02-2666.

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I. REAL PARTY IN INTEREST

The real party in interest is the assignee, Intel Corporation.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences known to the Appellants, the Appellants' legal representative, or assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1, 4, 5, and 7-16 of the present application are pending and remain rejected. The Appellants hereby appeal the rejection of claims 1, 4, 5, and 7-16.

IV. STATUS OF AMENDMENTS

Appellants are appealing a Final Office Action issued by the Examiner on April 7, 2003. On July 31, 2003, Appellants' filed a Notice of Appeal from this Final Office Action.

V. SUMMARY OF INVENTION

In the past, segmentation and reassembly (SAR) was implemented in a chip, which had several disadvantages.[1] A first disadvantage of implementing the SAR chip is cost.[2] As the price points of personal computers (PCs) continue to decrease, the additional expense of SAR chips is undesirable.[3] A second disadvantage of using SAR chips is the limited flexibility in changing

[1] See specification, page 3, line 13.
[2] See specification, page 3, lines 13-14.
[3] See specification, page 3, lines 14-16.

other components coupled to the SAR chip.[4] Thus, a more inexpensive and flexible method of implementing SAR functions is needed.[5]

This is provided by embodiments of the present invention related to a system and apparatus that uses software implemented in a multipurpose central processing unit (CPU) to perform the segmentation and reassembly (SAR) functions in a personal computer.[6] As shown in Figure 3A, ATM cells are stored in a buffer 324 and CPU 328 processes the ATM cells to reassemble the data cells during reception and segments the data prior to transmission.[7] The CPU 328 may typically be a general purpose microprocessor, such that significant hardware savings may be had over hardware implementations of a SAR chip.[8]

As shown in Figure 3B, Figure 3B illustrates a simplified diagram of the flow of information within the computer system.[9] In Figure 3B, a UTOPIA bus interface 348 receives ATM Cells from a network (not shown).[10] The ATM cells are transferred along an ingress direction 350 to a cell First-In First-Out memory (FIFO) 354 which buffers the data.[11] When the CPU is ready to reassemble the ATM data, the content of FIFO 354 is transferred to PCI bus interface 358 for transfer along route 362 to a CPU which performs reassembly and processing of the ATM data.[12]

When outputting data, the CPU continues to generate new data which is associated with header information to form ATM cells and is transferred along route 366 to PCI bus interface 358.[13] The ATM cells are stored in a section of FIFO 354 for eventual transfer along egress route 370 to UTOPIA bus interface 348 for output to the network.[14]

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[4] See specification, page 3, lines 16-18.
[5] See specification, page 3, lines 18-20.
[6] See specification, page 6, lines 2-7.
[7] See specification, page 8, lines 18-20.
[8] See specification, page 8, lines 20-24.
[9] See specification, page 9, lines 1-2.
[10] See specification, page 9, lines 2-3.
[11] See specification, page 9, lines 3-5.
[12] See specification, page 9, lines 5-9.
[13] See specification, page 9, lines 10-12.
[14] See specification, page 9, lines 12-15.

Figure 4 is a block diagram showing the software SAR module coupled to a simplified ATM interface 404.[15] A reassembly block 408 of the software SAR module receives an incoming stream of ATM cells from one or more ATM virtual circuits (VCs) and reassembles those cells into ATM adaption layer (AAL) protocol data units (PDUs).[16] The AAL protocol PDUs are transferred for output along data path 412 for further processing or for use by the respective processing circuits.[17]

When receiving AAL protocol PDUs, segmentation block 416 receives a stream of AAL protocol PDUs 420 destined for one or more ATM VCs and segments them into ATM cells.[18] A traffic shaping block 424 receives the stream of ATM cells from the segmentation block 416 and outputs a stream of ATM cells for transmission to meet the quality of service (QOS) requirements for each VC and for the entire link.[19]

In one embodiment of the invention, the software SAR module is also used to receive data from hardware at a processing unit.[20] The procedure for receiving such data is illustrated in the flow diagram 700 of Figure 7.[21] In the flow diagram 700 the PCI interface transfers a plurality of ATM cells to a buffer or "input buffer."[22] The CPU monitors to determine whether there are cells left in the input buffer in block 708.[23]

When the cell contains an end of PDU signal in block 728 indicating that the cell is the last cell in a data sequence, the CPU determines whether a CRC matches in block 732.[24] When no CRC match is found an error occurred during data transfer and a portion of payload data unit (PDU) received so far is dropped in block 734, the system returns to block 708 to determine a

[15] See specification, page 9, lines 16-17.
[16] See specification, page 9, lines 17-20.
[17] See specification, page 9, lines 20-23.
[18] See specification, page 10, lines 1-3.
[19] See specification, page 10, lines 3-7.
[20] See specification, page 12, lines 9-10.
[21] See specification, page 12, lines 10-12.
[22] See specification, page 12, lines 12-13.
[23] See specification, page 12, lines 13-15.
[24] See specification, page 13, lines 5-7.

number of retrieved cells remaining in the input buffer in block 708.[25] When a CRC match is found in block 732, the CPU determines whether there is a length match in block 736.[26] When the length of the payload data unit does not match the indication for the expected length an error has occurred and the PDU is dropped in block 740.[27] The system returns to determine a number of retrieved cells remaining in the input buffer in block 708.[28] When in block 730 the lengths match, the system transfers the PDU to a virtual channel (VC) owner in block 744.[29]

VI. ISSUES

The issues are:

(1) Whether claims 1, 4, 5, and 7-16 are unpatentable under 35 U.S.C. §103(a) as being obvious over U.S. Patent No. 6,262,995 issued to Kwak.

VII. GROUPING OF CLAIMS

For the purpose of this appeal:

- Claims 1, 4, 5, and 7-16 stand or fall together as Group I.

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[25] See specification, page 13, lines 7-11.
[26] See specification, page 13, lines 12-13.
[27] See specification, page 13, lines 13-15.
[28] See specification, page 13, lines 16-17.
[29] See specification, page 13, lines 18-19.

VIII. ARGUMENTS

A. Arguments Directed to the Allowance of the Claims of Group I (Claims 1, 4, 5, and 7-16)

As set forth on pages 2-4 of the Final Office Action, claims 1, 4, 5, and 7-16 were rejected under 35 U.S.C. 103(a) as being allegedly rendered obvious over U.S. Patent No. 6,262,995 issued to Kwak. Appellants respectfully traverse the Final Office Action's obviousness rejections in their entirety and respectfully request that the Board reverse these rejections, for the reasons set forth below.

A prima facie obviousness rejection requires that three basic criteria be met. First, there must be some teaching, suggestion, or motivation, either in the references themselves, or in the knowledge generally available to one skilled in the art, to modify the reference or to combine the references. Second, there must be some reasonable expectation of success. Finally, the prior art reference, or references when combined, must teach all of the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, *and not based on the Applicant's disclosure.* MPEP § 2142; In re Vaeck, 947 F. 2d. 488 (Fed. Cir. 1991) (emphasis added).

Moreover, as aptly stated by the Federal Circuit in *In re Kotzab*, 55 U.S.P.Q.2D (BNA) 1313, 1316-1317 (Fed. Cir. 2000):

> Most if not all inventions arise from a combination of old elements. Thus, every element of a claimed invention may often be found in the prior art. However, identification in the prior art of each individual part claimed is insufficient to defeat patentability of the whole claimed invention. Rather, to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant...*Even when obviousness is based on a single prior art reference, there must be a showing of a suggestion or motivation to modify the teachings of that reference.* (Emphasis added).

As set forth in the Appellants' independent claims 1, 5, 9, and 14, Appellants' invention relates to performing asynchronous transfer mode (ATM) segmentation and/or reassembly functions with a segmentation and reassembly (SAR) *software module implemented in a central processing unit (CPU) of a personal computer*, among other limitations.

Appellants believe that the Final Office Action is in error in finding that Appellants' independent claims 1, 5, 9, and 14 are rendered obvious by Kwak and is using impermissible hindsight. This is because Kwak quite simply does not teach or suggest *a SAR software module implemented in a central processing unit (CPU) of a personal computer to implement segmentation and/or reassembly* as set forth in Appellants' independent claims; and, in fact, the ATM terminal of Kwak utilizing a software segmentation and reassembly device (SSID) is the very type of prior art that Appellants' claimed invention was designed to improve upon.

Nonetheless, the Final Office Action states that it is well known in the art that a personal computer can be used to perform multimedia communications including voice communications. (Final Office Action, page 4). Further, the Final Office Action states that one skilled in the art "would have been motivated" to use a personal computer as the ATM terminal for multimedia communications and that therefore it "would have been" obvious to one having ordinary skill in the art to use a personal computer as the ATM terminal of Kwak. (Final Office Action, page 4).

Appellants respectfully submit that the ATM terminal of Kwak utilizing SAR device 20, simply because it performs segmentation and reassembly functionality, does not render obvious Appellants' claimed invention related to a personal computer having a SAR software module implemented in the CPU of the personal computer to perform SAR functions, as set forth in Appellants' independent claims 1, 5, 9, and 14. Especially in view of the fact that an ATM terminal utilizing a SAR type device, as in Kwak, is the very type of prior art that Appellants' claimed invention was designed to improve upon.

The invention of Kwak relates to an ATM terminal having a central processing unit (CPU) operating *in conjunction with* a software segmentation and reassembly (SAR) interface device (SSID) 20 to process AAL1, AAL3/4, and AAL5 in ATM. (Kwak, column 1, lines 10-14; emphasis added)-- i.e., not a personal computer interfacing to an ATM network in which the *CPU of the personal computer implements ATM segmentation and/or reassembly functions utilizing a software module (i.e. a SAR software module)*, as in Appellants' independent claims 1, 5, 9, and 14.

Figure 2 of Kwak is a block diagram of an AAL processing apparatus using a software segmentation and reassembly (SAR) interface device (SSID 20) in an ATM terminal (Kwak, column 3, lines 49-52). Figure 3 of Kwak shows a detailed diagram of the SAR device 20, which shows that the SAR device 20 of Kwak includes a utopia interface 21, a double port RAM interface 22, a control unit 24, and a CPU interface 23.

Kwak quite simply does not teach or suggest a personal computer having a SAR software module implemented in the CPU of the personal computer to perform segmentation and/or reassembly functions, along with other limitations, such as traffic shaping.

In fact, nowhere does Kwak teach or suggest performing ATM segmentation and/or reassembly functions with *a segmentation and reassembly (SAR) software module implemented in a CPU of a personal computer...* It should be particularly noted that, Appellants' claimed invention, as set forth in independent claims 1, 5, 9, and 14, is directed away from using ATM terminals with specialized SAR devices and is designed around these types of devices.

As stated in Appellants' patent application, Appellants' invention uses "software implemented in a multipurpose central processing unit to form the segmentation and reassembly functions in a personal computer...The use of software to perform the segmentation and reassembly reduces the cost...." (Appellants' patent application, page 6, paragraph 1). Moreover, as the Appellants point out in the patent application, by utilizing a software module implemented

in a CPU to perform these functions, "significant hardware savings may be had over hardware implementations of a SAR chip." (Appellants' patent application, page 8, paragraph 2). Thus, embodiments of the invention relate to using a software module to perform these functions, implemented in a CPU of a personal computer, to provide advantages over the prior art, such as Kwak.

Appellants respectfully submit that the Final Office Action is erroneously treating Appellants' invention defined by independent claims 1, 5, 9, and 14 for performing asynchronous transfer mode (ATM) segmentation and/or reassembly functions with a segmentation and reassembly (SAR) software module *implemented in a central processing unit (CPU) of a personal computer* as the equivalent of the prior art Kwak ATM terminal utilizing SAR device 20, and, in hindsight, erroneously finds Appellants' invention to be obvious over Kwak; when Kwak is the very type of prior art that the embodiments of Appellants' claimed invention were designed to improve upon in the first place. The only justification given for this by the Examiner is that that one skilled in the art "would have been motivated" to use a personal computer as the ATM terminal for multimedia communications and that therefore it "would have been" obvious to one having ordinary skill the art to use a personal computer as the ATM terminal of Kwak. (Final Office Action, page 4).

As pointed out by the Federal Circuit, reliance solely on "skill in the art," is generally insufficient to modify a reference to reach an obviousness judgment. In Al-Site Corp. v. VSI Int'l, Inc., 50 USPQ2d 1161, 1171 (Fed. Cir. 1999), the Federal Circuit stated: "Rarely, however, will the skill in the art component operate to supply missing knowledge or prior art to reach an obviousness judgment." (Emphasis added). Thus, it is insufficient as a matter of law for the Final Office Action to simply state that the Appellants' invention "would have been obvious" because it would have been within the skill in the art of someone ordinarily skilled in the art at the time to simply modify Kwak to recreate Appellants' invention.

Further, Appellants respectfully submit that the Final Office Action's position that one of ordinary skill in the art would have been motivated to use a personal computer as the ATM terminal for multimedia communications and that, therefore, it would have been obvious to one having ordinary skill in the art to use a personal computer as the ATM terminal of Kwak utilizing SAR device 20, is impermissible hindsight. As stated by the Federal Circuit: "To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art references or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher." W.L. Gore Assocs. v. Garlock, Inc., 220 USPQ 303, 312-313 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984).

As should be noted, an ATM terminal, such as a networking terminal, is very different from a general-purpose personal computer that can be programmed, easily updated with new programs, is generally low cost in nature, is easily replaceable, etc. There is quite simply no motivation to alter Kwak's ATM terminal utilizing SAR device 20 that performs ATM functions, and that works well for its intended purpose, to, in hindsight, try to recreate Appellants' invention as defined by independent claims 1, 5, 9, and 14. In fact, Appellants' invention is directed towards overcoming the limitations associated with higher cost ATM type terminals, by using general-purpose personal computers.

The only rationale given for modifying Kwak is that it "would have been obvious" to one of ordinary skill in the art to modify Kwak to obtain the claimed invention by merely utilizing a personal computer instead. This is insufficient as a matter of law and is classic impermissible hindsight.

Therefore, Appellants' respectfully submit that Kwak, neither alone, nor in combination with the skill in the art, would have rendered obvious Appellants' independent claims 1, 5, 9, and 14 directed to performing ATM segmentation and/or reassembly functions in a CPU of a

personal computer (e.g. with a segmentation and reassembly (SAR) software module), at the time of Appellants' invention.

Accordingly, Appellants' respectfully submit that a prima facie case of obviousness has not been met and Appellants' respectfully request that the rejection of independent claims 1, 5, 9 and 14 be reversed, and that independent claims 1, 5, 9 and 14 be allowed. Furthermore, the dependent claims are patentable for being dependent from allowable base claims.

IX. Conclusion

For the foregoing reasons, Appellants respectfully submit that claims 1, 4, 5, and 7-16 are not rendered obvious by Kwak, and therefore are patentable. Accordingly, Appellants respectfully request that the Board enter a decision overturning the Examiner's rejection of all pending claims, and hold that the claims are not rendered obvious by the cited prior art reference and are patentable.

Deposit Account Authorization

Authorization is hereby given to charge our Deposit Account No. 02-2666 for any charges that may be due.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: September 30, 2003

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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, Alexandria, VA. 222313-1450 on: September 30, 2003.

Nicole Erquiaga — *Date* 9/30/03

X. APPENDIX

The claims of the present application which are involved in this appeal are as follows:

Claim 1. (Previously Presented): A method comprising:

performing asynchronous transfer mode (ATM) segmentation functions with a segmentation and reassembly (SAR) software module implemented in a central processing unit (CPU) of a personal computer including,

receiving data to send;

segmenting the data to generate a plurality of ATM cells;

buffering the plurality of ATM cells in a memory device;

traffic shaping the buffered plurality of ATM cells; and

transmitting the plurality of ATM cells on a network.

Claims 2-3 (Canceled).

Claim 4. (Previously Presented): The method of claim 1 wherein the traffic shaping of data is performed by the central processing unit (CPU) of a computer.

Claim 5. (Previously Presented): A program storage device readable by a machine, tangibly embodying a program of instructions executable by a machine to perform method steps for segmenting asynchronous transfer mode (ATM) data, the program comprises:

a first code section to instruct a CPU of a personal computer to segment data to generate a plurality of ATM cells, the first code section including segmentation instructions implemented in the CPU to perform the operation of segmenting data;

a second code section to buffer the plurality of ATM cells in a memory device; and

a third code section to traffic shape the buffered plurality of ATM cells.

Claim 6. (Canceled).

Claim 7. (Original): The program storage device of claim 5 wherein the program further comprises:

a fourth code section to compute a new partial cyclic redundancy check used to protect against bit errors.

Claim 8. (Original): The program storage device of claim 5 wherein the program includes instructions to pad ATM cells which are not complete.

Claim 9. (Previously Presented): A method comprising:

performing asynchronous transfer mode (ATM) reassembly functions with a segmentation and reassembly (SAR) software module implemented in a central processing unit (CPU) of a personal computer including,

receiving in an uninterrupted stream a plurality of protocol data units without interrupt in an input buffer, each protocol data unit including a plurality of ATM cells; and

retrieving ATM cells from the input buffer until all data corresponding to a payload data unit is retrieved and checking a CRC to determine whether data was received without error.

Claim 10. (Original): The method of claim 9 further comprising:

dropping the payload data unit when the CRC indicates an error.

Claim 11. (Original): The method of claim 9 further comprising:

copying a cell payload from the input buffer into a reassembly buffer.

Claim 12. (Original): The method of claim 11 further comprising:

calculating a new partial CRC corresponding to the cell payload.

Claim 13. (Original): The method of claim 11 further comprising:

determining whether the cell payload includes an end of payload data unit marker; and

copying a second cell payload from the input buffer into the reassembly buffer when retrieved cell payload does not include the end of payload data unit marker.

Claim 14. (Previously Presented): A program storage device readable by a machine tangibly embodying a program of instructions executable by a machine to perform method steps for reassembly of ATM data, the program comprising:

instructions readable by a CPU of a personal computer to instruct the CPU to reassemble ATM data, the instructions including reassembly instructions implemented in the CPU to perform the operation of the reassembly of data further including,

a first code section to receive a stream including a plurality of protocol data units without interrupt in an input buffer, each protocol data unit including a plurality of ATM cells.

Claim 15. (Original): The program storage device of claim 14 further comprising:

a second code section to retrieve ATM cells from the input buffer until all data corresponding to a payload data unit is retrieved and checking a CRC to determine whether data was received without error.

Claim 16. (Previously Presented): The program storage device of claim 14 further comprises:

a third section to copy a cell payload from the input buffer into a reassembly buffer.